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ABSTRACT

This research project was designed to determine whether 1-week-old neonates would indicate biological recognition of their mothers. Biological recognition is defined as the particular configuration of sensory, kinesthetic, and motor cues and the temporal patterning of these cues which characterizes infants' exchange processes with their caregivers. Participants were five dyads composed of white, working class, multiparous mothers and their female offspring. All dyads were provided with hospital rooming-in within the first 24 hours after delivery and the mother was the sole caretaker throughout the period of this study. All neonates were considered normal and were on a demand bottle feeding schedule. Study participants were observed in their homes for one feeding session on postnatal days 6, 7, and 9. Baseline data were collected in the first session. In the second and third sessions, data were collected while the mothers were wearing either a flesh-colored mask with eyeholes or a gauze drape with no eyeholes. The results indicated that the response to the masks began only when the neonate was settled into the customary position and about to begin feeding and that the response to the two masks differed. It was found that the general response to the flesh-colored mask was distress and active avoidance while the response to the gauze mask tended to be distress and passive avoidance. (JMB)

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Neonatal Recognition Processes and Attachment:

The Masking Experiment

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ABSTRACT

By the end of the first week of life, selected female neonates display recognition of mother as determined by systematic behavioral events of the neonates consequent upon masking of the mother. A biological basis for attachment may exist in the entrainment of rhytmic neonatal functions by periodically encountered maternal event - configurations, here perturbed by masking.

Recent research findings have indicated a hitherto unsuspected level of functional sophistication in neonatal visual and auditory perceptual systems(1). In addition, a recent study(2) has demonstrated that for a population of six female neonates, selected for long scanning times, discrimination of the mother from humanoid and abstract stimuli is manifested at least by week two.

The question that these findings raise is the function of this sensory precocity, and its relation to the extreme dependancy and lack of motor precocity of the human newborn. We would propose that one result of the lack of motor precocity is that it functions to demand a high level of interaction between the neonate and the mother; and that the sensory precocity functions to allow the neonate to "take advantage" of these interactions for the purpose of information enrichment. Given this perspective, what light might it throw on neonatal development?

In considering the neonatal state, the most essential functions to be performed are those which relate to the achievement of neonatal self-regulation. It is clear that the degree of self-regulation present at birth is rather limited. In essence, the neonate may be most suitably characterized as an organism exhibiting the activity of a set of semi-independent oscillators whose periods and phase relations are desynchronized. As a consequence, the neonate is in a state of relative disorganization, and has but a primitive level of rhythmically organized adaptive functioning. In that complex functioning may be closely tied to the organization of rhythmic systems(3), factors which influence this organization are of central concern.

An even more central concern however is related to the fact that the physiological integrity of any biological system depends directly upon the achievement and maintenance of some minimal degree of phase synchrony between the oscillating functions. In most organisms, this synchrony is achieved through the entrainment of the semi-independent oscillating functions to some extrinsic Zeitgeber such as the solar light-dark cycle. Through the entrainment of each of the oscillating functions to a given Zeitgeber phase synchrony between the functions is achieved. In humans research has indicated that it is aspects of the social environment and their schedule, constrained by physical or climatic rhythms, that is the primary synchronizer of human rhythms(4).

For a Zeitgeber to function it must be a Zeitgeber for the organism. That is to say, it must be distinctive, periodic, and biologically recognizable by the organism. We would thus propose that the recurrent mother-event and her schedule will first come to be registered by the neonate in terms of specific temporal relationships to its endogenous rhythmicities, and will then come to function as a Zeitgeber. And that the mother-neonate entrainment thus achieved will constitute the primitive form of the attachment relationship. It is to be noted that evidence for the presence of neonatal oscillatory entrainment has recently been provided(5).

The functions of attachment are thus viewed as first providing the interactive bases for the negotiated achievement of self-regulation(6); and secondly, to allow the infant and developing child to utilize her sensory precocity for active exploration of her environment. These two factors are presumed to be developmentally sequenced in that such

utilization is strictly contingent upon the presence of secure bidirectional links to a caregiver which provide both support and buffering for the infant's self-exposure to the environment.

In that the development of any level of mother-infant relationship is considered to be a negotiated achievement, it follows that the presence of neonatal recognition and attachment may be considered to be an index of the state of the mother-infant relationship. Its presence thus depends upon the development of specific temporally organized exchange processes between the mother and infant.

The present research project was organized to test the hypothesis that, given a particular caretaking context and a particular set of neonates, by the end of the first post-natal week neonates would indicate recognition of the mother, and that the caretaking events and their schedule would be functioning as a Zeitgeber for the neonate.

It is to be noted, that the hypothesized neonatal recognitory processes are not conceptualized in terms of the psychological recognition of the mother as "mother". Rather, it is considered to be a biological recognitory process which serves as the anlage for the later development of person recognition. What is recognized by the neonate, as a complex biological organism, is the reappearance of a specific "context gestalt," characterized for the neonate in terms of the particular, unique configuration of sensory, kinaesthetic, and motor cues and their temporal patterning which have come to characterize the particular temporal setting for her exchange processes with her caregiver. It is proposed then that it is this specific temporal context gestalt that serves as the Zeitgeber for her state transitions, including transition to sleep;

and proper phasing of transitions within sleep.

In order to test for the presence of the recognition and entrainment, a perturbation of the specific context gestalt has been introduced. It was predicted that consequent upon a meaningful perturbation, the neonate would display specific alternations in her pattern of visual contact with the mother, the pattern of postural contact, the pattern of feeding, and the transition to REM sleep and then NREM sleep.

The wearing of masks and the maintenance of silence were utilized as the controlled variables of the disturbance. Additional uncontrolled variables of disturbance, such as maternal anxiety, are also assumed to be present. One mask was made from flesh-colored cloth with eyeholes provided and reached to the hairline. The second was constructed by securing a white gauze drape without eyeholes to a green surgical cap.

Subjects were five highly selected rather homogeneous dyads. These were uniformly composed of white, working class multiparous mothers and their female offspring. All dyads were provided with hospital rooming-in within the first 24 hours after delivery, and the mother was the sole caretaker throughout the period under concern. All neonates satisfied our criteria for normalcy; and all neonates were on a demand bottle feeding schedule.

Mothers were contacted prior to delivery and again during confinement. For our observations, the mothers and their neonates were visited three times in their homes for one full feeding period each time. The observation commenced upon the neonate's wakening from sleep, continued throughout the feeding period, and concluded following transition from the first REM sleep period. Observational variables were recorded by

coded entries using a 4 Key Rustrak Event Recorder moving at 6" per minute. The observational sessions were carried out during the first feeding after 7:30 a.m. on the three days. Major activities of the mother and major variables of the infants' activities and state changes were recorded(7).

The first visit was on postnatal day 6 and constituted the baseline observation of a non-masked feeding. The second and third visits were on days 7 and 9 with a mask being worn for the complete feeding. The order of presentation of the two masks were counterbalanced across dyads.

The results were most interesting both in terms of the presence of responses and in terms of the differences in the patterns of response to the two masks. While the pattern of response to the two masked feedings differed, the response to both began only when the feeding was about to be initiated after the neonate had been settled into the customary feeding position in the crook of the mothers' arm. At that point in the temporal context gestalt, as the neonate was taking the nipple for the first time, she would briefly gaze to and regard the mother. This occured in both the baseline and experimental conditions. It was at this point in the experimental conditions that the differentiating response patterns commenced.

Figure 1 displays mean frequences and durations for variables of patent significance. The pattern of response to the flesh mask (FM) portrayed there involved high frequency of widening of the palpebral fissures, active avoidance of the mother (mother's typical comment, "She never reared back like that before, she kept rearing back..."), and scanning when returned to the crib after conclusion of the feeding. On the other hand, the gauze drape (GD) led to very infrequent palpebral

widening and active avoidance, and the presence of long duration passive avoidance, defined as visual and postural adjustment away from the mother (mother's typical comment, "She never did that before. She just turned and wouldn't look at me.").

Figure 2 presents means for additional variables which complement the differences in response patterns. A series of independent one-way repeated measures analysis of variance demonstrated significance for length of REM sleep period ($F = 10.7087$, $df = 2,8$, $p < .01$), regard frequency ($F = 10.884$, $df = 2,8$, $p < .01$), and distress events ($F = 8.4127$, $df = 2,8$, $p < .05$). The picture that may be garnered from these figures is one in which for the flesh mask the response pattern in contrast to baseline, included increased regard at both higher frequencies and longer durations, increased distress events and increased cry and non-cry vocalizations. For the gauze drape, the pattern in contrast to baseline comprised more frequent shorter regards early in the feeding, and less frequent longer scans, more frequent distress events and non-cry vocalizations.

Less milk was drunk for both feedings than for baseline ($F = 6.12598$, $df = 2,8$, $p < .05$), and following the feeding, scan while in crib occurred for the flesh mask treatment as noted. The treatments by length of feeding prior to REM approached significance, with the flesh mask being longer than baseline and the gauze drape shorter. Transition to REM sleep was marked by difficulty and the presence of in-crib distress events for the flesh mask, and by ease and rapidity for the gauze drape. In comparison to baseline, the length of the first REM period was increased following the flesh mask, and decreased following the gauze drape. These latter results are suggestive of differential disturbances

in state transition, and differential reactions to disturbance-stress.

Let us summarize with another mother's comments: "Last time (flesh mask) she kept looking and looking at me like she couldn't believe it. And she was very upset, I told you she never spit up before. This time (gauze drape) was totally different. She didn't want to have nothing to do with me. She peeked at me then that was it. It was like a cold wind in August."

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7. All reported observations were performed by T.Z.K.C. Reliability tests were carried out by T.Z.K.C. and a trained student for six unmasked feedings with four other dyads, and one set of masked feedings. Reliabilities ranged between .81 and .96.

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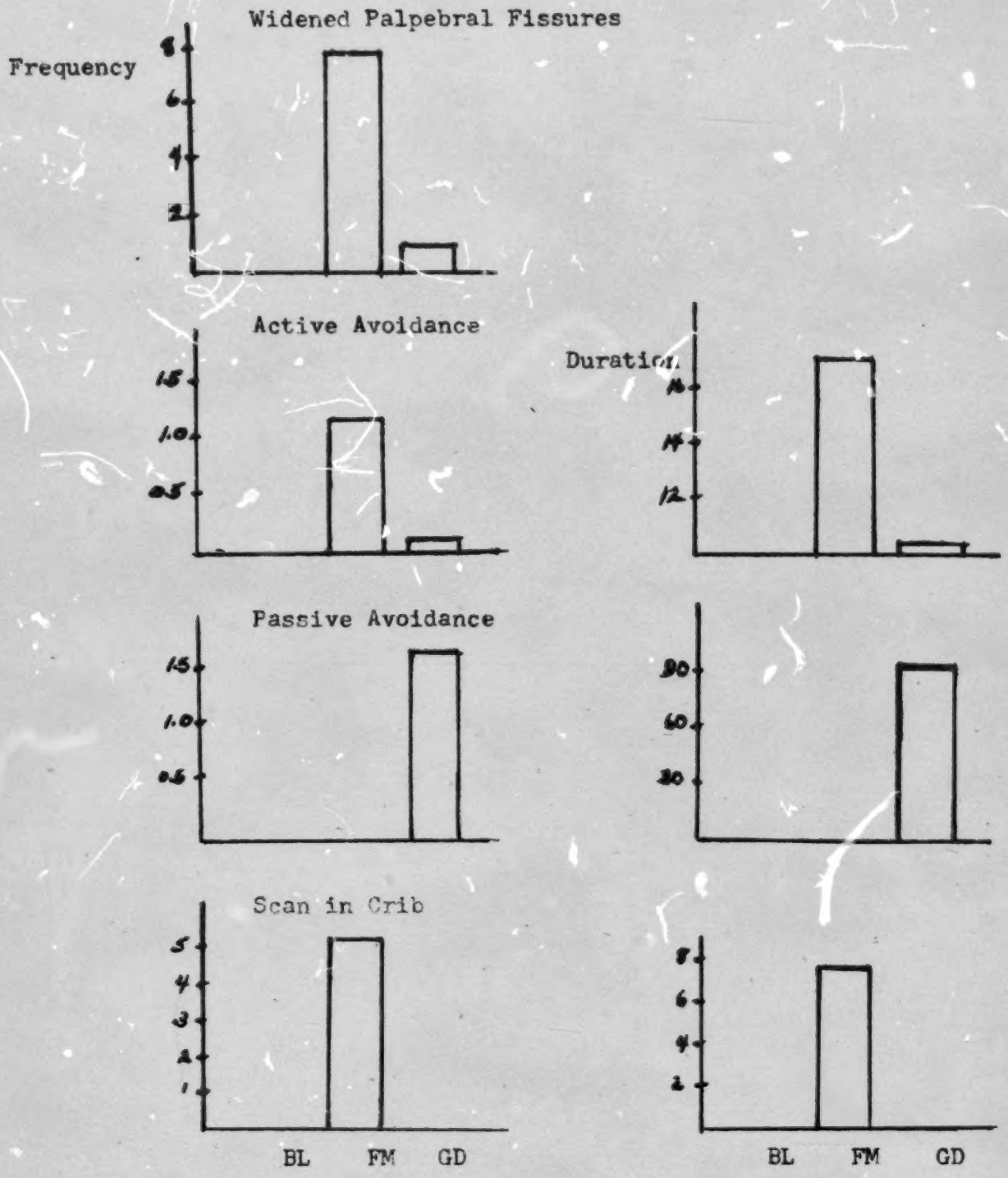

Group A.

Figure 1. Mean frequencies and durations (in seconds) for patently significant variables; baseline (BL), flesh mask (FM), gauze drape (GD).

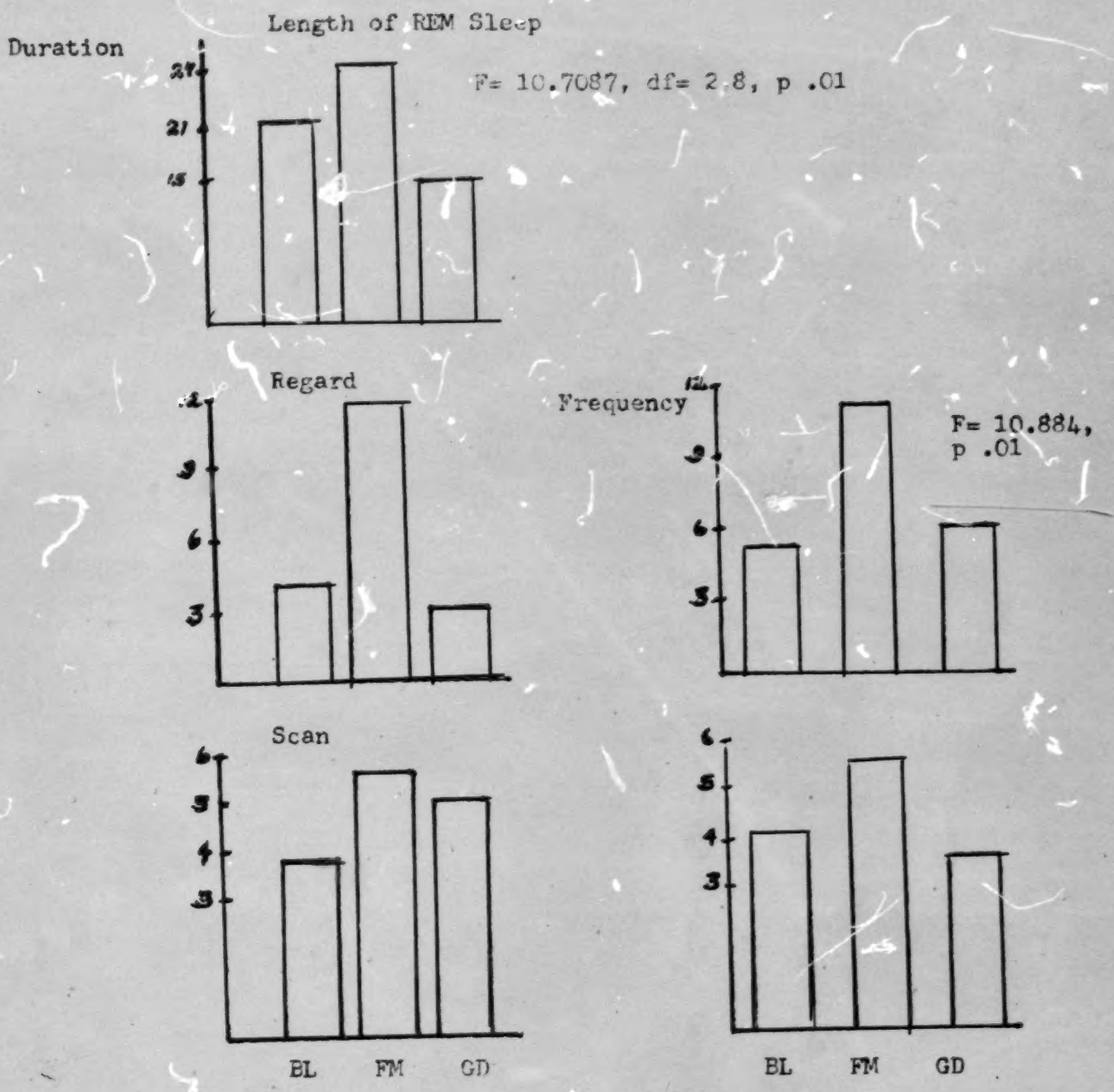

Figure 2. Mean frequencies and durations (in minutes for REM, in seconds for regard and scan) for additional variables.

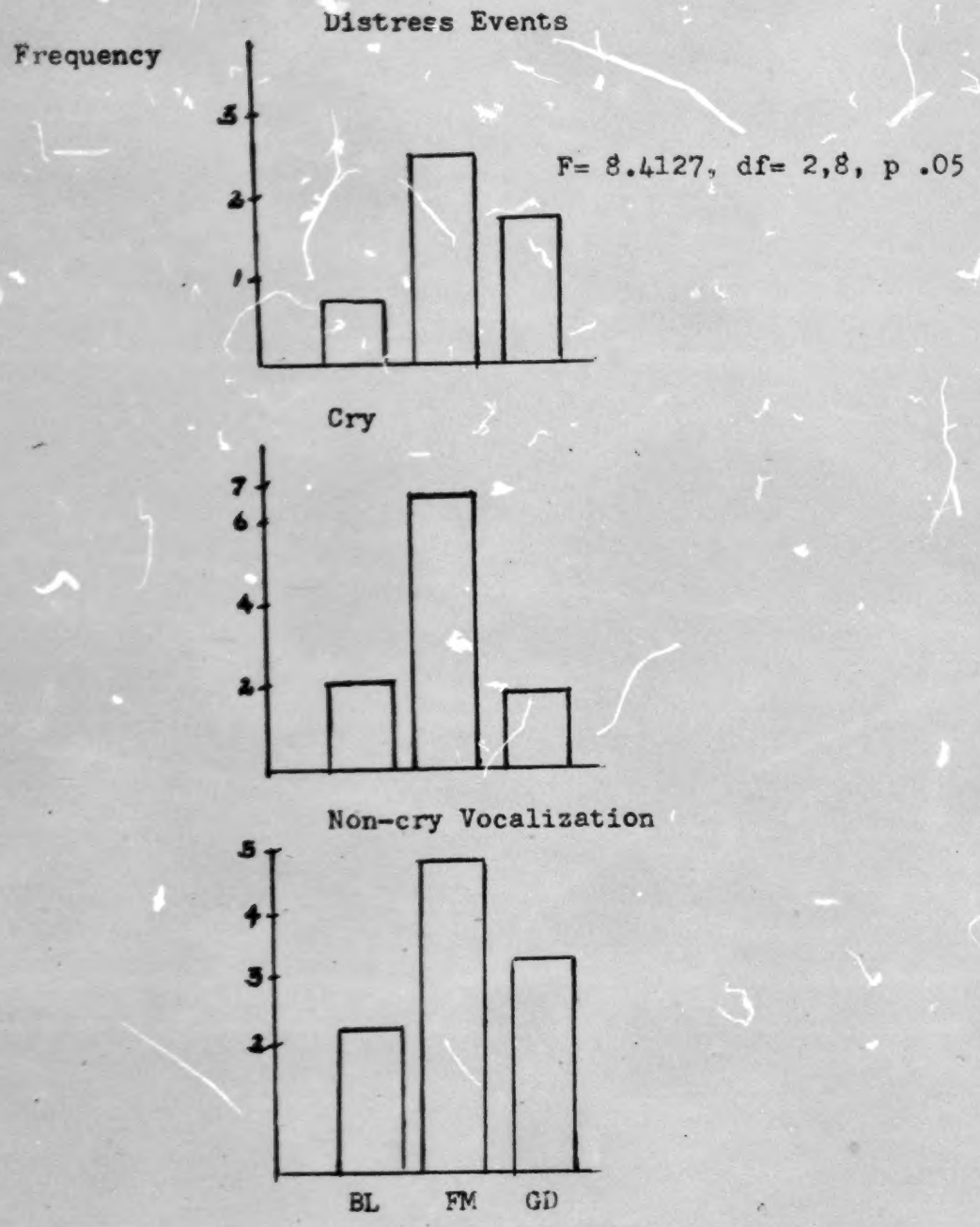

Figure 3. Mean frequencies for additional variables.